

X

A COMPARATIVE STUDY OF BRAILLE GRADE ONE AND A HALF AND BRAILLE GRADE TWO

By

ROBERT B. IRWIN, *Executive Director*

and

RUTH E. WILCOX, *Statistician*

BUREAU OF RESEARCH AND EDUCATION
AMERICAN FOUNDATION FOR THE BLIND, INC.
125 EAST 46TH STREET
NEW YORK, N. Y.
1929

HV 1672

.I 79

1929



Digitized by the Internet Archive
in 2013

A COMPARATIVE STUDY OF BRAILLE GRADE ONE AND A HALF AND BRAILLE GRADE TWO

By

ROBERT B. IRWIN AND RUTH E. WILCOX

Reasons for the Study

During the past few years there has been an increasing interest in braille grade two in the United States. A recent canvass of the library users in this country shows that about twenty per cent of them read grade two to a greater or less extent. Many of these grade two readers are enthusiasts for this system, and have been surprisingly active in their proselyting work. Some of those who attended the 1929 Convention of the American Association of Workers for the Blind were alarmed at the extent to which the old "type question" was raising its head.

American authorities agree that grade two has certain objections, but in spite of these objections grade two is gaining in popularity. What are the redeeming features of grade two? Could these redeeming features be separated from the objectionable features? If they were separated, would grade one and a half be improved by appropriating these features? Would such an appropriation be worthwhile? The most obvious, and as a matter of fact, the principal difference between grade one and a half and grade two is the number of contractions and abbreviations used. Grade one and a half has 44 contractions, as compared with 189 in grade two. What is the relative importance of these various contractions? To what extent does each save space? To what extent do they facilitate reading? To what extent do they complicate reading? In other words, does grade two really have some superiority over grade one and a half, and if so, of what does it consist?

It was with such questions as these in mind that the Research Department of the American Foundation for the Blind recently undertook a study of certain characteristics of grade two which were not thoroughly covered by the Uniform Type Committee. The results of this study are set forth in this leaflet, and are commended to the thoughtful, dispassionate consideration of the reader.

Grade One and a Half and the Present Situation

Twelve years ago the American workers for the blind adopted braille grade one and a half, which consists of the British braille alphabet and 44 of the one-cell contractions. They also adopted the British system of mathematical notation and the braille music notation. The grade two capital sign was assigned to the less important post of italics sign, while the less obtrusive italics sign in grade two was adopted as the capital sign in grade one and a half. The exclusion of the remaining 145 contractions and abbrevia-

tions was based upon certain objections, some of them demonstrated by the tests, and others largely theoretical.

When grade one and a half was adopted in the United States it was with the hope that by a process of addition and elimination the English-speaking world would ultimately agree upon a form of the code which might meet with universal acceptance. The Commission on Uniform Type for the Blind, which with its predecessor, the Uniform Type Committee, had been instrumental in bringing about the adoption of this system, was instructed to "continue its labors with the British National Uniform Type Committee with the view of reaching a complete agreement regarding the whole question of uniform type."* In 1923, when the Uniform Type Commission ceased to exist, the American Association of Workers for the Blind requested the Foundation to carry forward the activities of that Commission. (See Resolution on page 8.)

The average American is appalled by the fact that grade two contains more than four times as many contractions as grade one and a half. An examination, however, of the 145 contractions in grade two not included in grade one and a half shows that 73 are abbreviations, the significance of many of which is very obvious. For instance, the learner need be told hardly more than once that *brl* stands for *braille*, *cd* for *could*, *pd* for *paid*, *rcv* for *receive*, etc. The tendency of Americans to enlarge upon the difficulties of learning so many contractions, making no distinction between abbreviations and arbitrary characters, is irritating to the British grade two devotee, and forces him to conclude that American spokesmen either have not taken the trouble to learn the grade two system, or that the much-vaunted Yankee intelligence and adaptability are not characteristics to be associated with blind people and their friends on this side of the water.

A grade two reader may read grade one and a half without any special instruction, and a grade one and a half reader may, without any great difficulty, learn grade two. We are told, however, that few British grade two readers do make much use of grade one and a half books. Many explanations of this have been advanced. The average British reader tells you that it is annoying to meet with words spelled out which he is accustomed to find printed in contractions. Probably the psychological reason behind the dislike for grade one and a half is based on the fact that the rapid reader, at least, reads in large measure by word form rather than character by character, and the omission of so many of the frequently recurring contractions changes the general form of a considerable number of the words so that they must be spelled out by the British casual grade one and a half reader before they are recognized.

Students of the subject are convinced that so long as there is the present marked gap between grade one and a half and grade two, there will be

*Report of the Commission on Uniform Type for the Blind, June 1917, page 14.

no general interchange of books between the United States and Great Britain. This is unfortunate, because considerable money is being spent on both sides of the Atlantic in the publishing of braille. During the first decade of the history of grade one and a half, most of the books published in that system were designed for school use. Since educators neither in Great Britain nor the United States have much interest in textbooks prepared for pupils in the other country, there has as yet been no great waste. Recently in America an increasing amount is being devoted to the publication of books for adults, and this increase is likely to have a rapid growth. In spite of the sentiment against duplicating titles in grade two, many books are put into grade one and a half which have already been published in grade two. If publishing for the blind were a commercial enterprise supported by readers amply able to indulge their whims as well as their tastes, we might look with complacency upon this duplication. Since, however, books for the blind must be paid for by the public, either through taxation or philanthropic contributions, do we have a moral right to sit by and watch this waste of money, if any sound basis of arriving at a reasonably satisfactory compromise can be discovered?

Contractions—Their Importance and Limitations

Braille contractions have three purposes: 1st, to save space; 2nd, to facilitate reading; and 3rd, to facilitate writing. In evaluating any contraction all these purposes should be taken into consideration. No extensive study has been made of the effect of contractions upon writing. It is safe to say, however, that so long as contractions are not increased in number to the point where they constitute a burden on the learner, writing is facilitated in direct proportion to the extent to which the number of dots is reduced. Again, if they are not too numerous, other factors being equal, contractions probably facilitate reading in about the same proportion that they save space.

Much valuable information regarding the relative legibility and frequency of recurrence of braille characters is to be found in the reports of the Uniform Type Committee, but unfortunately no exhaustive analysis was made of the relative space-saving values of the contractions and abbreviations peculiar to grade two.

The Uniform Type Committee's study showed that certain characters in the lower part of the cell, especially when standing alone, as in a word sign, are easily confused with similar characters in the upper part of the cell, such as *but-be*, *just-was*, *go-were*, *every-enough*, *have-his*, and such characters as the sign for *still* and *child* are confused with the sign for *knowledge*. (See page 7, *First Report, Uniform Type Committee*, 1907; and page 33, *Fifth Biennial Report, Uniform Type Committee*, 1915.) This is accentuated in non-sense lists of words, such as were used in testing the legibility of these signs. The average reader is not usually conscious of these con-

fusions because the context tends to correct misapprehensions. There is, however, no doubt but that they cause some hesitation on the part of the casual reader.

The Committee's studies also showed that certain contractions cause hesitation not only because of their infrequency of recurrence in general literature, but also because of the similarity of the principle upon which they are developed. For example, *work*, *word*, and *world* have a low degree of frequency, and are built from the *w* preceded by dot 4, dots 2-4, and dots 2-4-6, respectively. The grade one and a half capital sign also causes difficulty with the contractions which are built up by preceding the character by dot 4, as for example, *day*, *ever*, *father*, *here*, etc.

We have long been aware that the same material in grade two as usually printed occupies about 12% less space than it does in grade one and a half, but hitherto we have not known very much about the respective space-saving powers of each of the 145 contractions not found in grade one and a half. Without this information it is difficult to discuss intelligently any proposal to add contractions to grade one and a half. For example, there is a confusion between the signs for *have* and *his*. Either of these contractions is excellent when the other one is not in the system. If it is deemed worth while to reopen the question of compromise with the British, one should know whether *have* or *his* has the greater space-saving value. Again, there are several two-cell contractions which America rejected on the ground that two-cell contractions were objectionable. If any modification of grade one and a half is to be considered, one should know the space-saving value of these two-cell contractions and weigh this value against the objections to them.

Again, there is an objection to contractions which can only be used under special conditions, such as prefixes or suffixes. In this case also we should know their space-saving powers in order to be able to match them against the objections to them.

Space-Saving Value of Grade Two Contractions

In order to obtain the information regarding the space-saving value of the contractions peculiar to grade two, a careful study was made by the Foundation of selections taken from four different books of widely varying kinds of material. The aggregate number of words in these selections was 91,564. 20,791 words were taken from "Man of Property" by John Galsworthy; 30,699 words from a collection of short stories by modern American authors entitled "My Story That I Like Best"; 27,031 words from "Ether and Reality" by Sir Oliver Lodge; and 13,043 words from the "Book of Job." These particular titles were selected partly because they were already published in either grade one and a half or grade two, thus saving the labor and expense of embossing, and partly because they seem to be fairly representative of various classes of literature. In calculating this material, it was

treated as if written in one continuous line, thus eliminating all questions growing out of the effect of varying line lengths in different books, as well as hyphens at ends of lines, paragraphs, etc.

The 91,564 words in grade one and a half used in this study occupied 427,776 cells, including characters and word spaces. In grade two these words occupied 376,866 cells. From this it will appear that grade two requires 50,910 cells or 11.9% less than grade one and a half. This saving is accomplished by the omission of capitals, the omission of spaces between certain words, such as *forthe*, *withthe*, etc., by the use of certain contractions not employed in the grade one and a half system, and by the use of certain grade one and a half contractions under conditions not permitted in grade one and a half.*

These space-saving elements have been classified and ranked in various tables. The space-saving value of each contraction is obtained by multiplying the number of cells each contraction saves by the number of times it appeared in the 91,564 words studied. In determining the cells saved by each contraction account is taken of the contractions used in grade one and a half. For instance, in grade two the sign for *know* occupies two cells. *Know* in grade one and a half is written *k-n-(ow)*, that is, using the *ow* sign which occupies one cell. Thus it will be seen that in grade one and a half *know* is written in three cells as compared with two cells in grade two. Accordingly grade two *know* effects a saving of one cell. *By* occupies one cell in grade two, and is written without a word space between it and the following word. It may therefore be said to save two cells as compared with grade one and a half, for in writing *by* in grade one and a half two characters are required in addition to the word space following it.

Certain individual contractions do not have as great a space-saving value as others because they recur so infrequently in general literature. For example, the contraction for *yourselves* occupies four cells in grade two as compared with nine cells in grade one and a half, thus saving five cells. It appears, however, but four times in the 91,564 words, and therefore may be said to have a space-saving value of 4 times 5 or 20. The sign for *was* occupies one cell in grade two as compared with three cells in grade one and a half, thus saving two cells. It appears 814 times or has a space-saving value of 2 times 814 or 1628.

A count was made of the number of times each contraction and capital sign was found in the 91,564 words as written in grade one and a half and in grade two. The space-saving elements have been treated in various ways in order to show their relative importance. The 50,910 cells saved by writing the material in grade two as compared with grade one and a half have been analyzed and a calculation made of the percentage of saving effected

*The rules of grade one and a half do not allow the use of a contraction, part of the letters represented in which are in one syllable, and part in another. For instance, the *en* sign may not be used in *renounce* whereas in grade two this is permitted.

by each contraction or printing practice.† From this we find that 17.037% of the saving was accomplished by the omission of capitals; 3.268% was accomplished by the omission of word spaces between such words as *and*, *for*, *of*, *the*, *with*, *a*; .946% was accomplished by the use of contractions found in grade one and a half which were used under conditions not permitted in that system; and 78.746% was accomplished by the use of the 138 contractions not found in grade one and a half.*

Inasmuch as there is a great deal of variation in the space-saving value of contractions, a calculation was made to determine what percentage of the 50,910 cell saving was accomplished by each contraction. (See Table I.)

When it is demonstrated that certain contractions recur with such a low degree of frequency that they effect very little saving in general literature, most people will admit that they are not among the strong points in grade two. It is fair to raise the question, furthermore, as to whether or not the inclusion of these contractions in grade two is worth while. If they have some ambiguous feature or if their meaning is not suggested by their composition, it would seem to the student of the subject that grade two would be strengthened by eliminating them. This would apply also to certain contractions which have a rather noticeable space-saving value in some highly specialized forms of literature, but which recur with a low degree of frequency in *general* literature. For example, do the signs for *Lord*, *Jesus*, *holy*, *glory*, etc., effect sufficient saving of space in religious matter to justify their inclusion in the general system?

On the other hand, when we find that the contraction for *to* saves over 7% of the space saving accomplished by grade two over grade one and a half, that the contraction for *ea* saves over 3%, *ation* over 2%, and that such contractions as *tion*, *con*, *had*, and *ble* save over 1½% respectively, those who are interested in carrying forward the original intent to bring about greater uniformity in the braille systems of the English-speaking world must produce strong reasons for not including these contractions in books printed for adults.

An examination of the appended tables reveals many such possible additions and subtractions, which if resorted to in a spirit of practical "give and take," might strengthen both systems and accomplish most gratifying progress toward uniformity without imposing undue burdens upon the grade one and a half reader or depriving the grade two reader of contractions having marked space-saving powers.

It is hoped that by a dispassionate study of this subject, and by open-minded discussion on both sides of the Atlantic, some tentative basis may be found which will give sufficient promise of mutual concessions to justify

†By printing practice is meant such space-saving devices as the omission of capital signs, omission of spaces between certain words, etc.

*The following seven contractions used in grade two but not in grade one and a half did not appear in the 91,564 word: *braille*, *conceiving*, *deceiving*, *declaring*, *Jesus*, *one-self*, and *rejoicing*.

the calling of a meeting of a joint committee representing the United States and Great Britain, vested with the responsibility of working out changes in the two systems which will reduce materially the inconvenience of passing from one system to the other. The conclusions of this committee should, of course, then be submitted for ratification to the properly constituted authorities in the respective countries concerned.

In the light of the information discovered by this study, would not American workers for the blind and other braille readers do well to give serious thought to the possibility of improving grade one and a half by adding a limited number of contractions and abbreviations, whether the British authorities show any interest in joint action or not? A few contractions could be added to grade one and a half without in any way destroying the usefulness of the existing braille books. For this reason any proposal to make such a change bears no analogy to the proposal which resulted only a few years ago in the terrific sacrifice of libraries and equipment on the altar of uniformity. At best, braille is but a poor substitute for the efficient tool which the ink-print page has proved in the hands of those with sight. Blind people and their friends should therefore ponder carefully any facts having a bearing upon ways of improving the system.

RESOLUTION 15

Adopted by the American Association of Workers for the Blind

Janesville, Wisconsin

June, 1923

WHEREAS, The Commission on Uniform Type has now completed the work for which it was constituted and in accordance with this fact, the American Association of Instructors of the Blind at its Convention in June, 1922, recommended that the work be taken over by the American Foundation for the Blind; and

WHEREAS, The Commission is the creature jointly of the American Association of Instructors of the Blind and the American Association of Workers for the Blind,

Be It Resolved, That the action taken by the Instructors' Convention a year ago be confirmed at this Convention.

Be It Further Resolved, That in taking over the work the Foundation have respect to the various Steering Sub-Committees of the Commission in so far as it may be practicable, in order to retain the necessary expert service to carry on the work so well begun.

Moved and seconded that this resolution be adopted.

TABLE I

In the 91,564 words counted grade two occupied 50,910 less cells than grade one and a half. What percentage of this saving of space was accomplished by each of the grade two contractions not found in grade one and a half?

It will be noted from the table below that the contraction having the highest space-saving value is *to*, the next being *st*. These two contractions, taken alone, save twelve per cent of the space saving accomplished by the 145 contractions and abbreviations peculiar to grade two. The next three contractions considered in their rank as space savers are *his*, *ea* and *was*. These three contractions accomplish eleven per cent of the saving effected by the exclusively grade two contractions.

A further study of this table shows that the first 10 contractions considered from the standpoint of their space-saving value accomplished about one-third of the space effected by the 145 contractions peculiar to grade two. If we approach the table from the bottom and consider the space-saving value of those ranking lowest in the list, we find that the last 59 contractions accomplished less than five per cent of the saving effected by braille grade two over braille grade one and a half.

Contraction	%	Contraction	%	Contraction	%	Contraction	%
to	7.491	under	.549	perhaps	.282	above	.066
st	4.965	sion	.534	work	.278	beneath	.062
his	4.399	could	.526	almost	.276	o'clock	.062
ea	3.488	between	.518	character	.265	ourselves	.062
was	3.197	because	.500	itself	.259	yourself	.062
ation	2.380	ong	.496	ful	.255	paid	.058
ch	1.976	their	.491	cc	.253	herself	.058
tion	1.799	great	.483	also	.251	deceive	.054
con	1.736	ment	.479	these	.249	afterward	.054
had	1.528	ound	.479	unto	.243	declare	.053
ble	1.457	still	.479	beyond	.235	perceive	.053
be	1.441	always	.477	dd	.202	conceive	.049
com	1.422	must	.447	behind	.182	rejoice	.047
by	1.394	cannot	.439	world	.182	although	.039
little	1.312	good	.439	already	.180	child	.039
some	1.249	ence	.424	receive	.180	faith	.039
one	1.139	those	.404	spirit	.180	yourselves	.039
would	1.076	after	.404	God	.178	blind	.035
him	.972	such	.400	many	.176	below	.031
ance	.962	right	.400	father	.172	Christ	.031
dis	.950	ff	.394	name	.161	to-morrow	.031
were	.931	against	.388	your	.161	thyself	.029
ness	.895	should	.353	ount	.157	to-night	.029
said	.872	before	.349	here	.147	receiving	.023
about	.848	again	.345	enough	.141	glory	.017
into	.758	day	.341	myself	.135	grace	.017
time	.726	its	.333	gg	.127	to-day	.015
themselves	.707	through	.333	whose	.125	saith	.007
there	.691	part	.328	neither	.113	holy	.003
ally	.683	ought	.314	either	.113	perceiving	.003
himself	.652	word	.314	according	.108	braille	.000
ity	.585	less	.310	altogether	.108	conceiving	.000
know	.581	much	.298	Lord	.098	deceiving	.000
ever	.573	where	.286	mother	.086	declaring	.000
upon	.553	young	.286	bb	.084	Jesus	.000
		children	.284	immediate	.082	oneself	.000
				beside	.070	rejoicing	.000

TABLE II

How many times did each of the contractions peculiar to grade two appear in the selections studied?

What was the average number of times that each of the contractions peculiar to grade two appeared per 1000 words?

How many cells do each of the contractions peculiar to grade two save over the grade one and a half system?

What is the aggregate number of cells saved by the contractions peculiar to grade two?

Contraction	Frequency of Recurrence	Frequency per 1000 Words	Cells Saved	Aggregate Number of Cells Saved
to	1907	20.82	2	3814
st	2528	27.60	1	2528
his	1120	12.23	2	2240
ea	1776	19.39	1	1776
was	814	8.88	2	1628
ation	404	4.41	3	1212
ch	1006	10.98	1	1006
tion	458	5.00	2	916
con	442	4.82	2	884
had	778	8.49	1	778
ble	371	4.05	2	742
be	734	8.01	1	734
com	362	3.95	2	724
by	355	3.87	2	710
little	167	1.82	4	668
some	318	3.47	2	636
one	580	6.33	1	580
would	274	2.99	2	548
him	495	5.40	1	495
ance	245	2.67	2	490
dis	242	2.64	2	484
were	237	2.58	2	474
ness	228	2.49	2	456
said	222	2.42	2	444
about	216	2.35	2	432
into	193	2.10	2	386
time	185	2.02	2	370
themselves	90	.982	4	360
there	352	3.84	1	352
ally	174	1.90	2	348
himself	83	.906	4	332
ity	298	3.25	1	298
know	296	3.23	1	296
ever	292	3.18	1	292
upon	141	1.53	2	282
under	140	1.52	2	280
sion	136	1.48	2	272
could	134	1.46	2	268
between	66	.720	4	264
because	51	.556	5	255

TABLE II—(CONTINUED)

Contraction	Frequency of Recurrence	Frequency per 1000 Words	Cells Saved	Aggregate Number of Cells Saved
ong	253	2.76	1	253
their	250	2.73	1	250
great	123	1.34	2	246
ment	244	2.66	1	244
ound	244	2.66	1	244
still	61	.666	4	244
always	81	.884	3	243
must	114	1.24	2	228
good	112	1.22	2	224
cannot	56	.622	4	224
ence	216	2.35	1	216
those	103	1.12	2	206
after	103	1.12	2	206
such	102	1.11	2	204
right	102	1.11	2	204
ff	201	2.19	1	201
against	66	.720	3	198
should	90	.982	2	180
before	89	.971	2	178
again	88	.961	2	176
day	174	1.90	1	174
through	85	.928	2	170
its	170	1.85	1	170
part	167	1.82	1	167
word	80	.873	2	160
ought	160	1.74	1	160
less	79	.862	2	158
much	76	.830	2	152
young	73	.797	2	146
where	146	1.59	1	146
children	29	.316	5	145
perhaps	48	.524	3	144
work	71	.775	2	142
almost	47	.513	3	141
character	27	.294	5	135
itself	33	.360	4	132
ful	130	1.42	1	130
cc	129	1.41	1	129
also	64	.698	2	128
these	127	1.39	1	127
unto	62	.677	2	124
beyond	30	.327	4	120
dd	103	1.12	1	103
world	31	.338	3	93
behind	31	.338	3	93
already	23	.251	4	92
receive	23	.251	4	92
spirit	23	.251	4	92
God	91	.993	1	91

TABLE II—(CONTINUED)

Contraction	Frequency of Recurrence	Frequency per 1000 Words	Cells Saved	Aggregate Number of Cells Saved
many	45	.491	2	90
father	44	.480	2	88
name	41	.447	2	82
your	82	.895	1	82
ount	80	.873	1	80
here	75	.819	1	75
enough	24	.262	3	72
myself	23	.251	3	69
gg	65	.709	1	65
whose	32	.349	2	64
either	29	.316	2	58
neither	29	.316	2	58
according	11	.120	5	55
altogether	11	.120	5	55
Lord	25	.273	2	50
mother	22	.240	2	44
bb	43	.469	1	43
immediate	7	.076	6	42
beside	9	.098	4	36
above	17	.185	2	34
ourselves	8	.087	4	32
o'clock	8	.087	4	32
yourself	8	.087	4	32
beneath	8	.087	4	32
paid	15	.163	2	30
herself	10	.109	3	30
afterward	7	.076	4	28
deceive	7	.076	4	28
declare	9	.098	3	27
perceive	9	.098	3	27
conceive	5	.054	5	25
rejoice	6	.065	4	24
faith	10	.109	2	20
although	10	.109	2	20
yourselves	4	.043	5	20
child	5	.054	4	20
blind	9	.098	2	18
below	8	.087	2	16
to-morrow	4	.043	4	16
Christ	4	.043	4	16
to-night	5	.054	3	15
thysself	5	.054	3	15
receiving	4	.044	3	12
glory	3	.032	3	9
grace	3	.032	3	9
to-day	4	.043	2	8
saith	2	.021	2	4
holy	1	.010	2	2
perceiving	1	.010	2	2
oneself	0	.000	4	0
conceiving	0	.000	4	0
declaring	0	.000	2	0
Jesus	0	.000	3	0
rejoicing	0	.000	4	0
deceiving	0	.000	3	0
braille	0	.000	4	0

TABLE III

What is the frequency of recurrence of each of the grade two contractions?

What is the frequency per 1000 words of each of the grade two contractions?

Contraction	Frequency of Recurrence	Frequency per 1000 Words	Contraction	Frequency of Recurrence	Frequency per 1000 Words
*the	7005	76.50	*out	331	3.61
*in	3923	42.84	*from	327	3.57
*er	3670	40.08	some	318	3.44
*ed	3611	39.43	*so	306	3.34
*and	3466	37.85	ity	298	3.25
*of	3224	35.21	know	296	3.23
*en	3062	33.44	ever	292	3.18
*ing	2588	28.26	*this	291	3.17
st	2528	27.69	*can	279	3.04
*th	2261	24.69	would	274	2.99
*ar	2251	24.58	ong	253	2.76
to	1907	20.82	their	250	2.73
ea	1776	19.39	ance	245	2.67
*ou	1496	16.33	ment	244	2.66
*it	1362	14.87	ound	244	2.66
*that	1211	13.22	dis	242	2.64
*for	1139	12.43	were	237	2.58
his	1120	12.23	ness	228	2.49
*ow	1117	12.19	said	222	2.42
*sh	1050	11.46	ence	216	2.35
ch	1006	10.98	about	216	2.35
*wh	993	10.84	*shall	205	2.23
*with	852	9.30	*like	201	2.19
was	814	8.88	ff	201	2.19
had	778	8.44	into	193	2.10
be	734	8.01	time	185	2.02
*not	676	7.38	*do	182	1.98
*as	668	7.29	ally	174	1.90
*gh	646	7.05	day	174	1.90
one	580	6.33	its	170	1.85
*but	529	5.77	part	167	1.82
him	495	5.40	little	167	1.82
tion	458	5.00	*more	160	1.74
con	442	4.82	ought	160	1.74
*you	438	4.78	where	146	1.59
ation	404	4.41	upon	141	1.53
*which	400	4.36	under	140	1.52
*have	398	4.34	sion	136	1.48
ble	371	4.05	could	134	1.46
com	362	3.95	ful	130	1.42
by	355	3.87	*will	130	1.42
there	352	3.84	cc	129	1.41

*Grade one and a half contractions.

TABLE III—(CONTINUED)

Contraction	Frequency of Recurrence	Frequency per 1000 Words	Contraction	Frequency of Recurrence	Frequency per 1000 Words
these	127	1.39	beyond	30	.327
great	123	1.34	neither	29	.316
must	114	1.24	either	29	.316
*very	114	1.24	children	29	.316
good	112	1.22	character	27	.294
those	103	1.12	Lord	25	.273
after	103	1.12	enough	24	.262
dd	103	1.12	myself	23	.251
such	102	1.11	already	23	.251
right	102	1.11	receive	23	.251
*go	94	1.03	spirit	23	.251
*us	94	1.03	mother	22	.240
God	91	.993	above	17	.185
should	90	.982	paid	15	.163
themselves	90	.982	according	11	.120
before	89	.971	altogether	11	.120
again	88	.961	although	10	.109
through	85	.928	faith	10	.109
himself	83	.906	herself	10	.109
your	82	.895	beside	9	.098
always	81	.884	blind	9	.098
ount	80	.873	declare	9	.098
word	80	.873	perceive	9	.098
less	79	.862	below	8	.087
*just	78	.851	beneath	8	.087
much	76	.830	yourself	8	.087
here	75	.819	o'clock	8	.087
young	73	.797	ourselves	8	.087
*every	72	.786	deceive	7	.076
work	71	.775	afterward	7	.076
against	66	.720	immediate	7	.076
between	66	.720	rejoice	6	.065
gg	65	.709	child	5	.054
also	64	.698	conceive	5	.054
unto	62	.677	thyself	5	.054
still	61	.666	to-night	5	.054
cannot	56	.622	Christ	4	.043
because	51	.556	receiving	4	.043
perhaps	48	.524	to-day	4	.043
almost	47	.513	to-morrow	4	.043
many	45	.491	yourselves	4	.043
father	44	.480	glory	3	.032
bb	43	.469	grace	3	.032
*people	42	.458	saith	2	.021
name	41	.447	holy	1	.010
*rather	40	.436	perceiving	1	.010
*knowledge	39	.425	braille	0	.000
itself	33	.360	conceiving	0	.000
*quite	32	.349	deceiving	0	.000
whose	32	.349	declaring	0	.000
behind	31	.338	Jesus	0	.000
world	31	.338	oneself	0	.000
			rejoicing	*0	.000

TABLE IV

What is the frequency of recurrence of the grade one and a half contractions in grade two?

What is the frequency per 1000 words of the grade one and a half contractions in grade two?

Contraction	Frequency of Recurrence	Frequency per 1000 Words
the	7005	76.50
in	3923	42.84
er	3670	40.08
ed	3611	39.43
and	3466	37.85
of	3224	35.21
en	3062	33.44
ing	2588	28.26
th	2261	24.69
ar	2251	24.58
ou	1496	16.33
it	1362	14.87
that	1211	13.22
for	1139	12.43
ow	1117	12.19
sh	1050	11.46
wh	993	10.84
with	852	9.30
not	676	7.38
as	668	7.29
gh	646	7.05
but	529	5.77
you	438	4.78
which	400	4.36
have	398	4.34
out	331	3.61
from	327	3.57
so	306	3.34
this	291	3.17
can	279	3.04
shall	205	2.23
like	201	2.19
do	182	1.98
more	160	1.74
will	130	1.42
very	114	1.24
go	94	1.03
us	94	1.03
just	78	.851
every	72	.786
people	42	.458
rather	40	.436
knowledge	39	.425
quite	32	.349

TABLE V

What percentage of saving is effected by grade two over grade one and a half? 11.91%.

Grade two occupies what percentage of space occupied by grade one and a half? 88.09%.

Should the grade two authorities find it advisable to drop certain contractions, the following table, it is believed, will be helpful in calculating the effect on space occupied by the system. It indicates the percentage of increase in space caused by the omission of each grade two contraction. This increase is not absolutely accurate as the space-saving value of each is computed on a comparison with grade one and a half, whereas a separate calculation should be made for each contraction on a comparison with all the other contractions remaining after the elimination has been made. It is sufficiently accurate, however, to be usable as a basis of discussion.

Contraction	Percent	Contraction	Percent
to	1.012	upon	.075
st	.670	under	.074
his	.594	sion	.072
ea	.471	could	.071
was	.431	between	.070
ation	.321	because	.068
ch	.267	ong	.067
tion	.243	their	.066
con	.235	great	.065
had	.206	ment	.065
ble	.197	ound	.065
be	.195	still	.065
com	.192	always	.064
by	.188	must	.060
little	.177	cannot	.059
some	.169	good	.059
one	.154	ence	.057
would	.145	those	.055
him	.131	after	.055
ance	.130	such	.054
dis	.128	right	.054
were	.126	ff	.053
ness	.121	against	.053
said	.118	should	.048
about	.115	before	.047
into	.102	again	.047
time	.098	day	.046
themselves	.096	its	.045
there	.093	through	.045
ally	.092	part	.044
himself	.088	ought	.042
ity	.079	word	.042
know	.078	less	.042
ever	.077	much	.040

TABLE V—(CONTINUED)

Contraction	Percent	Contraction	Percent
where	.039	immediate	.011
young	.039	beside	.010
children	.038	above	.009
perhaps	.038	beneath	.008
work	.038	o'clock	.008
almost	.037	ourselves	.008
character	.036	yourself	.008
itself	.035	paid	.008
ful	.034	herself	.008
cc	.034	deceive	.007
also	.034	afterward	.007
these	.034	declare	.007
unto	.033	perceive	.007
beyond	.032	conceive	.007
dd	.027	rejoice	.006
behind	.025	although	.005
world	.025	child	.005
already	.024	faith	.005
receive	.024	yourselves	.005
spirit	.024	blind	.005
God	.024	below	.004
many	.024	Christ	.004
father	.023	to-morrow	.004
name	.022	thysself	.004
your	.022	to-night	.004
ount	.021	receiving	.003
here	.020	glory	.002
enough	.020	grace	.002
myself	.018	to-day	.002
gg	.017	saith	.001
whose	.017	holy	.0005
neither	.015	perceiving	.0005
either	.015	braille	.000
according	.015	conceiving	.000
altogether	.015	deceiving	.000
Lord	.013	declaring	.000
mother	.012	Jesus	.000
bb	.011	oneself	.000
		rejoicing	.000

11